ADELIN, CAMELLA JADE D. MAY 23, 2023

12 – FARADAY

## LESSON 6.3 KIRCHHOFF'S RULES

### Check Your Understanding

**A.**

| | |
|---|---|
| node | 1. A _____ is a point where two or more conductors meet in a circuit. |
| current | 2. Components are in series when _____ has a constant value throughout the path. |
| junction | 3. Kirchhoff's First Tule is also called Kirchhoff's Current Law (KCL) or the _____ Rule. |
| junction | 4. A _____ refers to a point where three or more conductors meet. |
| equivalent | 5. The First Rule states that the total charge or current that enters a node or unction is _____ to the charge that leaves the node or junction. |
| loop | 6. A _____ refers to a closed conducting path. |
| voltage drops | 7. Kirchhoff's Second Rule states that the net voltage around the loop in any closed loop system is equivalent to the sum of all the _____ within the same loop. |
| branch | 8. A _____ connects two junctions. |
| voltage | 9. Components are in parallel when a constant _____ is present in the whole circuit. |
| Conservation of Charge | 10. The _____ states that the algebraic sum of all the currents that pass through a node is equivalent to zero. |

**B.**

1. Identify the direction of the loop.

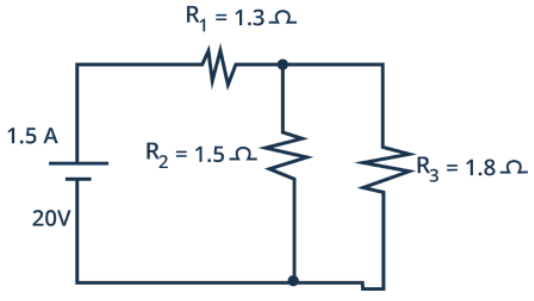
**clockwise**

2. Write the equation using the loop rule.

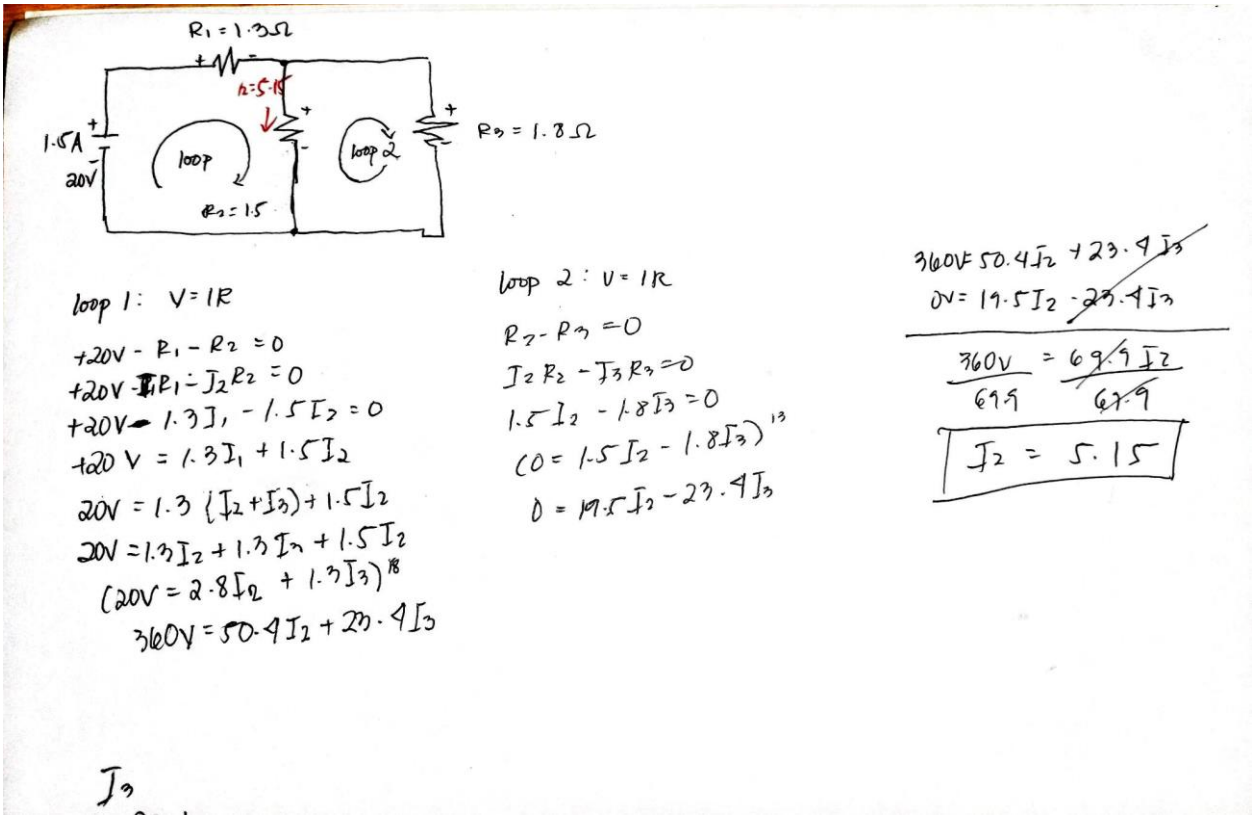
$$-\sum \boldsymbol{v} = \mathbf{0}$$

3. Solve the value of $I_2$.

$$\boldsymbol{I_2 = 5.15}$$



SOLUTION:




**LESSON 6.4 RC CIRCUITS**

**Check Your Understanding**

**A.**

| | |
|---|---|
| DC voltage source | 1. An RC circuit contains a resistor and a capacitor that are connected to a _____. |
| exponential | 2. There is an _____ time dependence between the capacitor and resistor in an RC circuit. |
| zero | 3. In an RC circuit, there is _____ charge in the capacitor prior to charging. |
| steady state | 4. In the _____ state of charging a capacitor, the current approaches zero, and the voltage across the resistor becomes equal to the emf across the capacitor. |
| time-dependent | 5. Lowercase letters I, v, and q are used to signify quantities that are _____. |

series 6. RC circuits have a capacitor and a resistor connected in _____.

RC / time constant/ relaxation time 7. _____ is the rate with which the capacitor becomes charged.

quicker 8. The smaller t is, the _____ the capacitor charges.

zero 9. At time t=0, q=Q, the capacitor becomes discharged from the resistor, yielding a magnitude of charge equal to _____.

time constant 10. RC is equal to the _____ of resistance ad capacitance.

B.

| Capacitance | Resistance | Time Constant |
|---|---|---|
| 0.22 uF | 1. $1.36 \times 10^{9} \Omega$ | 0.5 min |
| 2. $1.79 \times 10^{-3}$ F | 3900 Ω | 7s |
| 15pF | 6800u Ω | 3) $1.02 \times 10^{-13}$ |
| 6800uF | 4) 0.735 Ω | $5 \times 10^{-3}$ s |
| 5) 0.072F | 1000 Ω | 1.2 min |

SOLUTION